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Lubrication

A Technical Publication Devoted to the Selection and Use of Lubricants

THIS ISSUE

PRINTING
MACHINERY
LUBRICATION

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LUBRICATION

A TECHNICAL PUBLICATION DEVOTED TO THE SELECTION AND USE OF LUBRICANTS

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Change of Address: In reporting change of address kindly give both old and new addresses.

Printing Machinery Lubrication

NEARLY five centuries ago, John Gutenberg pioneered the art of printing when he is supposed to have adapted a modified wine press for printing from cast metal type. He was not the first to think of the idea of printing from blocks, however, because the Chinese had ante-dated him by many years in their efforts to reduce the tedious labor of hand copying, although they apparently had nothing in the way of a press. Until three hundred years after Gutenberg the old style wooden hand press was still in use. Not until the early 1800's were presses of more mechanical nature devised.

The mechanics of printing were accelerated by the advancement of rail transportation and the demand for more rapid circulation of the news. This required higher speed press operations. When Hoe perfected his relatively high speed news press in 1871 mechanisms of considerably greater intricacy were made use of. These involved a variety of gears and closer bearing fits.

This forerunner of the modern news press required careful lubrication for its maintenance, even in those days. Fortunately, the petroleum industry had developed by then a dependable type of lubricating oil which could take the place of the more costly and more unstable animal or vegetable oils. Naturally, these petroleum derivatives soon found a place in the press room. Later the art of grease-making progressed and made available the highly stable, oxidation-resistant greases which are now so essential for the anti-friction bearings.

PRESS DESIGN

The nature of the work to be done, dictates the type of press employed and is an indication of the running speed which is practicable. Three types of machines are available today, i.e.:

The platen
The flat bed, and
The rotary press.

They all serve the same primary purpose of impressing printed characters from a plate or form onto a single or a continuous sheet of paper.

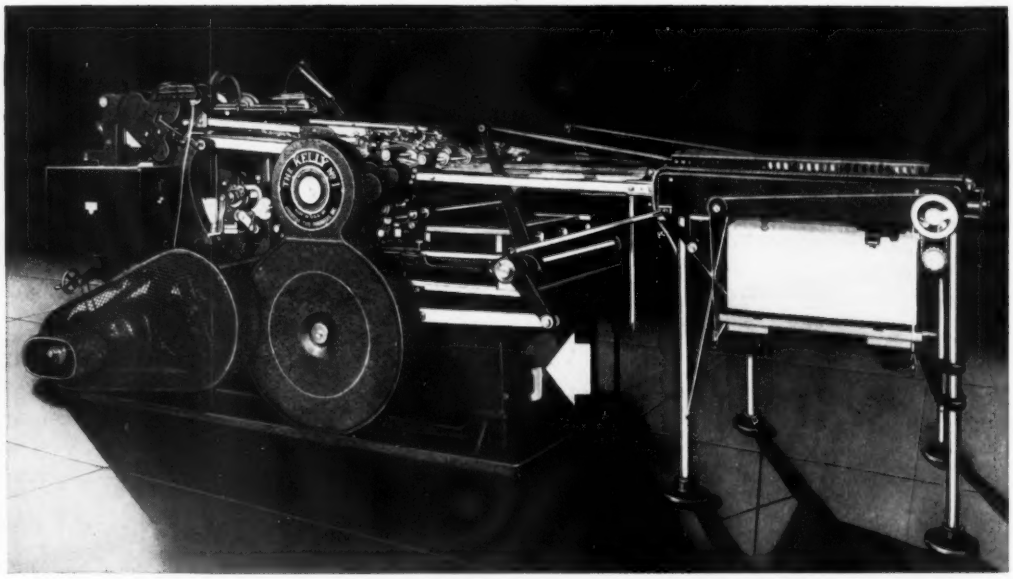
The Platen Press

This is the most simple mechanism; it is a device used largely for short run mailing pieces such as cards, envelopes, or circulars where from five to ten thousand impressions will be maximum. In such service, it is economical, due to its simplicity, ease of operation, and the rapidity with which the form can be made ready and registered. A platen press is a one-man machine; it requires but little power and floor space, and it can also be easily changed from one job to another.

Flat Bed and Rotary Presses

Publication printing, however, requires a more complex mechanism to meet modern production requirements in job printing, newspaper and magazine work. Flat bed cylinder presses and rotary presses are best adapted to such service. Speed of production is one of the most important factors in news printing hence the acceptance of the rotary press with its ability to turn out thousands of impressions per hour.

Press construction must be understood to appreciate the necessity for effective lubrication of press mechanisms.



Courtesy of American Type Founders Sales Corp.

Figure 1 — Side view of the ATF Kelly No. 1 press which is equipped with the Bijur automatic oiling system for metering clean oil automatically to each bearing while the press is running.

In the cylinder press, the paper receives its impression by passing around one or more impression cylinders in contact with either a flat bed or similar cylinder which carries the plates of typographical matter. It is possible to print in either one or two colors on one side of the sheet on a flat bed press, or to otherwise so design the press as to print in one or two colors on both sides of the paper in one operation.

THE FLAT BED PRESS

A variety of presses have been developed and perfected since the press went "mechanical" in the early part of the nineteenth century. Since then practically all the improvements have included some mechanical means for speeding up production, obtaining better reproduction and reducing the amount of labor required to handle paper on and off the machine. Speed of run really became practicable when the perfection of the electric motor enabled use of this device for driving the press and its related feeding machinery.

In the modern flat bed press, the paper is fed to the press guides in individual sheets, and the plates or type matter lie perfectly flat on the press bed, being securely locked in place. The paper is carried by a suitable device to the impression cylinder which in turning passes each sheet through in contact with the type bed, to bring about the impression, the type bed moving on a track under the cylinder at the same speed as the cylinder periphery.

Two or more sets of steel anti-friction rollers which travel on steel tracks installed the full length of the press carry the type bed. In operation the bed travels backward and forward periodically, being actuated by a suitable crank mechanism driven by gears from the main drive of the machine. As the direction of motion of the type-bed is changed the impression cylinder is automatically lifted from contact by means of suitable cam mechanisms in order to permit the cylinder to rotate continuously in one direction. Generally two revolutions of the cylinder are made to one backward and forward movement of the bed.

Inking Requires a Unique Mechanism

The inking device, is of interest to the petroleum industry since certain selected petroleum oils form the base of certain grades of printing ink. This ink is handled via a fountain, several distributing rollers, an ink plate which moves back and forth with the type bed, and several form rollers. Elastic composition and hard metal surfaces alternate, the fountain, ink plate, and lateral distributors being metal. The ink rollers, form, ductor and regular distributors consist chiefly of glue and glycerine, although rubber or other composition material may also be used. There are two sets of inking devices in the flat bed press designed for two-color work or the simultaneous printing of both sides of the paper in one color.

Printing ink is rather tacky, so in order to insure as perfect and uniform distribution as possible the several distributing rollers through which it is passed before being applied by form rollers to the type plates, are usually arranged to move from side

to side across the press with respect to each other during rotation. Their actual distance of travel is only a few inches, but the combination of rolling and sliding contact serves to effectively break up any larger particles of ink to suitable fineness and distribute it evenly along the length of each succeeding roll. The reciprocating motion of these vibrating rollers is brought about by means of special cam mechanisms.

Function of The Air Heads

Change of motion takes place rapidly in the flat bed press, the bed coming to an absolute stop on dead center for each revolution of the cylinder. This type of press is, therefore, frequently equipped with from two to four air heads located at each end of the machine in order to afford a temporary storage of energy when the bed approaches the end of its stroke. This accumulated energy serves to aid in starting the bed in the opposite direction to reduce the power required; it also relieves the pressure and shock on the driving mechanism during this period of stopping and starting.

Air heads function most effectively when the piston is fitted snugly in the cylinder. Yet the piston must enter with perfect freedom. Leakage of air would be a detriment; therefore, the ends of the pistons are usually fitted with leather cup packings, or piston rings. When properly installed and of sufficient pliability to conform to any minor undulations in the surface of the cylinder, these cups or rings help to trap the contained air upon entering, and to expand almost immediately due to the increasing pressure encountered. An effective seal is thus attained with full benefits of the compression. Inasmuch as this seal will be governed largely by the condition and manner of setting of the leather packing or the freedom of the rings, it is most important to observe the utmost care in handling. Leathers must be properly centered on the piston, capable of readily entering the cylinder, and quite soft and pliable; rings must expand or contract freely.

Air Head Lubrication

Air head lubrication must be planned according to the type of seal. Where leathers are involved they can be treated by periodic soaking or boiling in neatsfoot oil.

The walls of the cylinders, in turn can be lubricated by a medium bodied, average melting point grease. A suitable film of such a lubricant will not only reduce rubbing friction to a marked extent, but also will insure against leakage of air. On newer flat bed machines with air heads fitted with piston rings, cylinder wall and ring surface lubrication is maintained by a drip feed oiler designed so that as oil enters the cylinder it is atomized and spread by the air being compressed.

Courtesy of American Type Founders Sales Corp.

Figure 2 — Front view of the ATF Kelly No. 1 press showing the Bijur oil reservoir beneath the frame. Another view of this is shown by arrow in Figure 1.

Main Gear Lubrication

The main driving gear in a flat bed press is another very important piece of mechanism which must be lubricated. This gear carries the entire load of the machine and can be subjected to considerable wear because of lack of attention due to its usually inaccessible location beneath the type bed. This gear may also be subject to especially severe service when the air heads are not functioning correctly or where the pressure is not properly equalized. The abnormal jar resulting every time the press bed starts and stops would naturally subject the teeth to severe and uneven shock, with the result that wear would be excessive or, in extreme cases, the teeth might be stripped or chipped.

The best preventive measure is to keep the teeth well coated at all times with a good adhesive, heavy-bodied lubricant, which will not only resist squeezing out but will be capable of furnishing a sufficient cushion to prevent metal-to-metal contact between the gear teeth. There must be no tendency towards excessive fluidity even under abnormal temperatures so as to insure permanence in the film of lubricant and reduce the chance of throwing.

Other Moving Parts

The flat bed press also presents an assembly of bearings, cams, rollers, smaller gears and chains which must be lubricated.

Flat Bed Press Bearings

While most of the bearings on modern printing machinery run at room temperatures, some may be heated as for example at the ends of ink rollers.

These are often fitted with reservoirs in the top bearing cap or to one side of the base. These reservoirs are customarily packed with waste and designed for oil saturation at regular intervals. All bearings are not so accessible, however, for some are located beneath the press. To serve these, suitable piping is usually run from the holes in the bearing caps to the side of the press. Either oil or grease can be used according to the means of lubrication and the type of bearing. Centralized pressure oiling is well adapted to such bearings, using straight mineral oils of medium viscosity (viz: from 200 to 500 seconds saybolt at 100 degrees Fahr.).

Special attention must be given to such parts as bed motion shaft boxes, flywheel shaft boxes, cylinder and eccentric boxes. In fact, any bearing part located adjacent to the side frame or set in a close fit between the side frame jaws as are all types of cylinder boxes, require regular and careful lubrication. Any impairment of lubrication at these points may cause roughening of the wearing surfaces, etc., with the possibility of the cylinder being unable to take its full lift. This would affect the register and cause slurs.

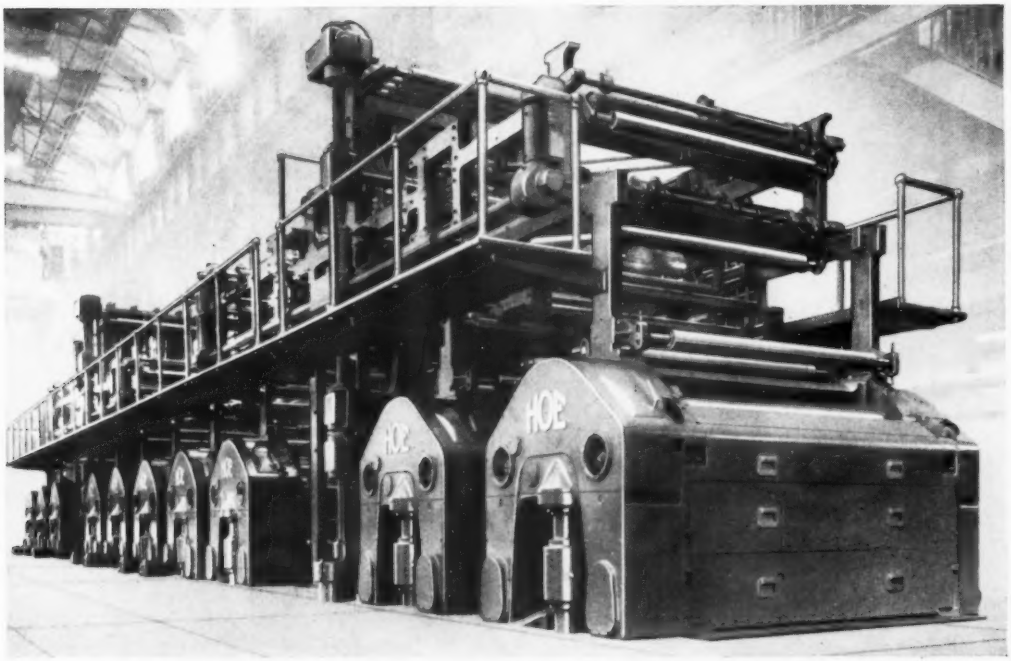
For grease lubricated bearings products of medium consistency should be used which can be readily handled in compression cups or pressure guns. Resistance to oxidation is recommended to obviate tendency to gum, otherwise the bearing grooves or races may become clogged to interfere with distribution of the lubricant.

Cams, Gears and Chain Links

This same grease, or the bearing oil is usually also applied to cam surfaces and chain links. On such parts, throwing of the lubricant can be objectionable. Even so, some types of presses not expressly designed for protected lubrication will permit a certain amount of lubricant to drain through plain bearings and find its way out along the end of the shafts to ultimately drip upon the mechanism below, or onto the floor. As a result, there will practically always be a certain amount of free lubricant in the process of dripping; and interior cams, gears and chains will receive their share. So there is usually but little chance of any such mechanisms being under-lubricated provided the bearings above receive sufficient lubrication. Putting light or medium bodied lubricants on gears is not always advisable especially if heavy gear lubricants have been used first. Mixture of the two may present a problem for the gear lubricant may be so thinned down by the lighter oil as to destroy its adhesiveness and protective ability. Many pressman, therefore, prefer a relatively heavy grease with sufficient soap content to insure against too great a reduction in the body of the lubricating film. Others rely on the press oil to lubricate their gears, oiling the latter with the same care and regularity they observe for their

Courtesy of Miehle Printing Press & Mfg. Co.

Figure 3 — Location of pump unit for automatic lubricating system for the Miehle 29 Letterpress . . . (A) is opening for filling reservoir; (B) the priming button and (C) the oil level gauge.



Courtesy of R. H. Hoe & Co., Inc.

Figure 4 — The new Hoe color-convertible newspaper press equipped with roller bearings, oil tight gear casings and visual automatic force-feed lubrication.

bearings. On lighter gears, oil will prove a very dependable lubricant, but the heavier roll gears will usually function with less noise, less wear and greater efficiency if a lubricant specifically designed for gears is used.

NEWSPRINT AND THE NEWS PRESS

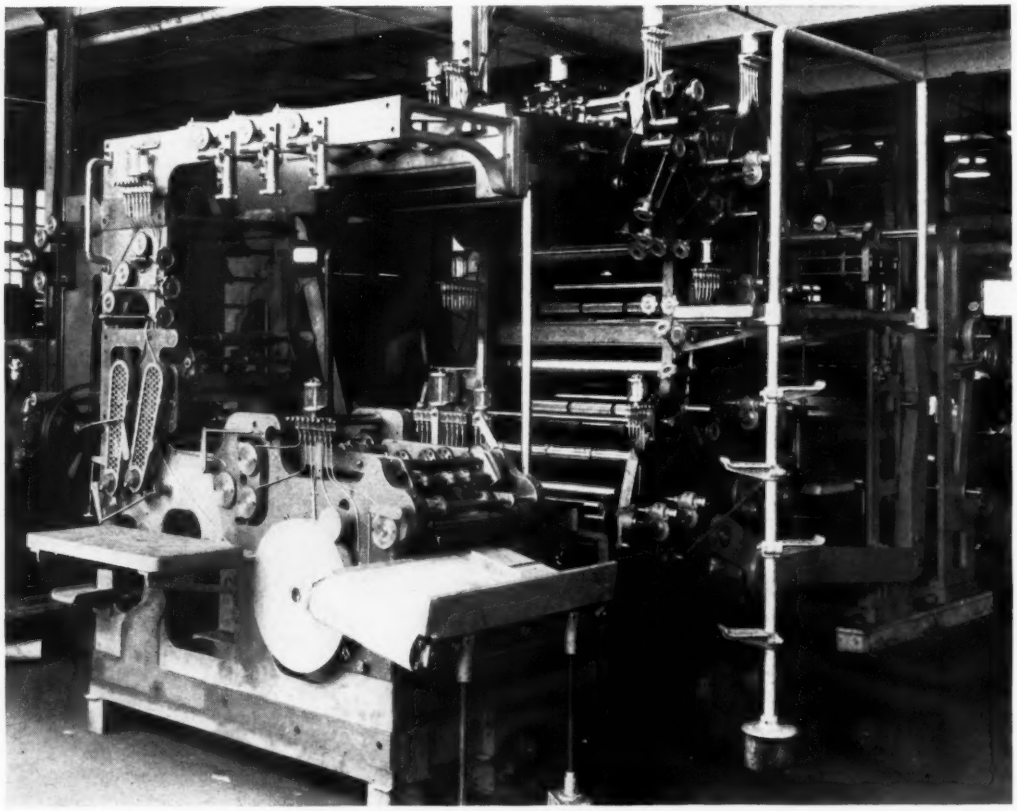
In a space of nearly a century and a half the production of newspapers has progressed from around 800 copies per hour per press to approximately 80,000 copies. This advancement has been made by improved mechanization of the news press which today requires considerably less labor.

Use of the cylinder press contributed markedly to this speed-up of production; it was the forerunner of the modern rotary news press. In this machine the paper is fed to it in a continuous sheet or web from a roll; hence, the origin of the term "web press." This is a rotary cylinder machine wherein the plates of typographical matter are curved to the periphery of the type cylinders and retained thereupon in proper relation to each other by means of a suitable locking device which is set when the press is made ready.

A news press is a complete producing unit in itself, by virtue of the fact that it can be constructed so as to print the paper on both sides, cut the printed web into pages along the proper margins, collect the necessary number of pages in numerical order into insets of desired size, fold the completed sets and deliver them ready for distribution by the newsdealers. The latest types of high speed presses can produce up to 120,000 papers per hour of a maximum of 16 pages inset, or 30,000 per hour of a maximum of 64 pages collected.

The production of such a press when applied to the printing of magazine insets for newspapers is also of interest. Typical examples of such work are the comic sheets and colored supplements in the Sunday papers. One of the largest presses of its kind in the world is capable of printing in from one to four colors, the maximum production ranging from 144,000 8-page 2-color insets to 36,000 16-page, 4-color insets per hour. Varying combinations are also possible in between depending upon the color arrangements and number of pages.

Four distinct printing sections or units are involved in a modern high speed octuple news press, located in pairs at each end of the machine. Between these units are the folding devices. There are two plate cylinders to each unit; upon these the curved stereotype plates are securely locked in place; opposed to the plate cylinders are the impression cylinders which serve to press the paper against the former, their surfaces being covered with blankets made especially for obtaining the proper impression. Each plate cylinder carries eight stereotype plates each the size of a full newspaper page, so the entire press has a capacity of sixty-four plates or



Courtesy of Kidder Press Co., Inc.

Figure 5 — Showing the gravity type sight feed oiling system piping and connections on a Kidder press.

pages of newsprint when "fully dressed" or ready for maximum production.

The Inking Mechanism

Ink distribution may involve either a set of individual ink rollers for each unit, which take their ink supply from an adjacent fountain, or a patented pump system of ink distribution whereby the ink is pumped from a supply tank in individual streams (one for each column of print) to the ink distributing cylinders. This latter device eliminates the ink fountain with its accessory lifting rollers.

Such a pump is usually composed of thirty-two small pumps, much on the order of a mechanical force feed lubricator. These pumps work in unison, being directly connected to the distributing cylinder which in turn is driven from the plate cylinders it serves. Thus the amount of ink supplied is always in direct proportion to the speed of the press. Each individual pump is capable of independent adjustment.

Where an ink fountain is involved each unit is equipped with its individual set of accessory ink rollers. In such an arrangement the ductor or lifting roller alternately dips into the fountain, the ink being subsequently transferred to the distributor rollers which are arranged to travel from side to side across the distributing cylinder with relation to each other, as on a flat bed press. Even distribution and complete breaking up of the ink is maintained by cam mechanisms which develop a vibrating motion.

Handling of the Paper

The webs of paper which come in rolls approximately six feet long and about thirty-two inches in diameter are placed either below each press section or at the end of the press, according to the design. In operation, the paper passes in a continuous sheet between the plate and impression cylinders where it is printed first on one side and then on the other.

From the press sections the webs or sheets then pass over rollers to the folding mechanism and after being slit along the center travel over a "V"-shaped former where the first longitudinal fold is brought about. These folded sheets are then cut to page size by a revolving knife cylinder, after which they receive their second or half-page fold. They are then delivered onto an endless belt arrangement ready for distribution to the readers. The novel fea-

ture of this delivery is the device which pushes out every fiftieth paper a little in advance of the others to simplify counting.

The web press involves much the same mechanical details such as bearings, gearing, and cam devices, as the flat bed press, with the exception that there is no reciprocating motion involved. Therefore, air cushions, bed rollers and tracks are eliminated. The magazine electrotype web press embodies practically the same principles of operation as the newspaper press.

News Press Lubrication

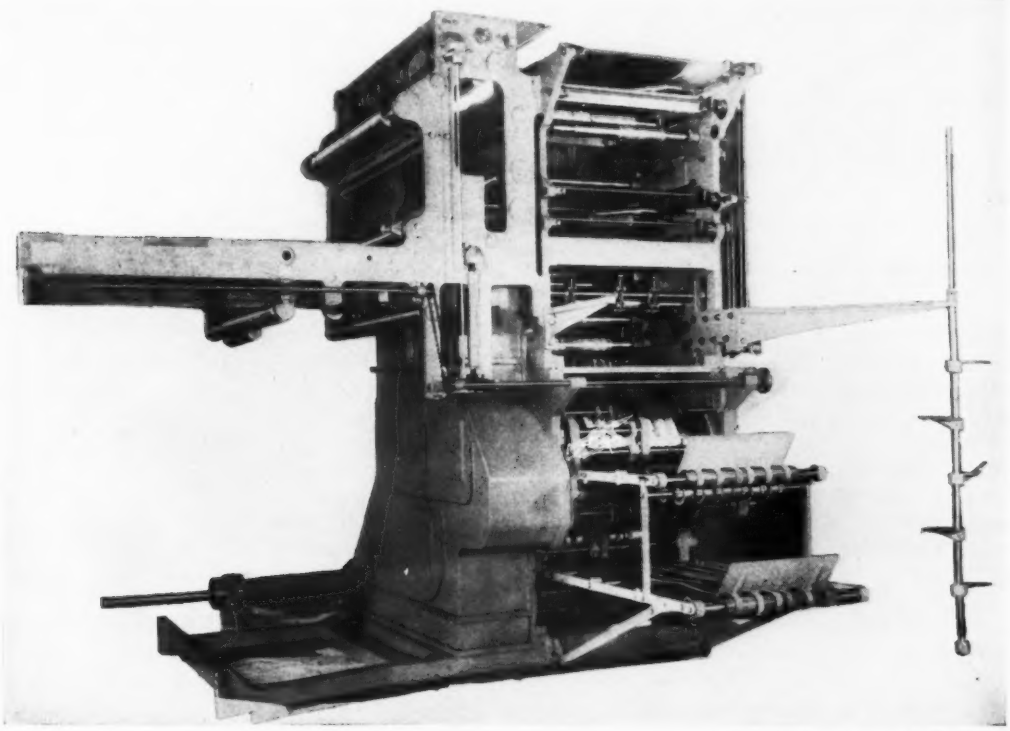
Modern press builders have appreciated the importance of proper lubrication and today most of them equip all important bearings of their machines with self-oiling or anti-friction bearings, and guard all gears as effectively as possible not only for the safety of the operators but also to improve the retention of the gear lubricant.

The web press involves an intricate assembly of bearings gears and cams; all are so definitely dependent upon the others that any interference with operation would affect the production of the machine as a whole. In other words, a stripped gear, a loose bearing, or a worn cam anywhere on the press might easily cause partial or complete shutdown, for such parts cannot usually be renewed or repaired during operation.

Ball and Roller Bearings Desirable

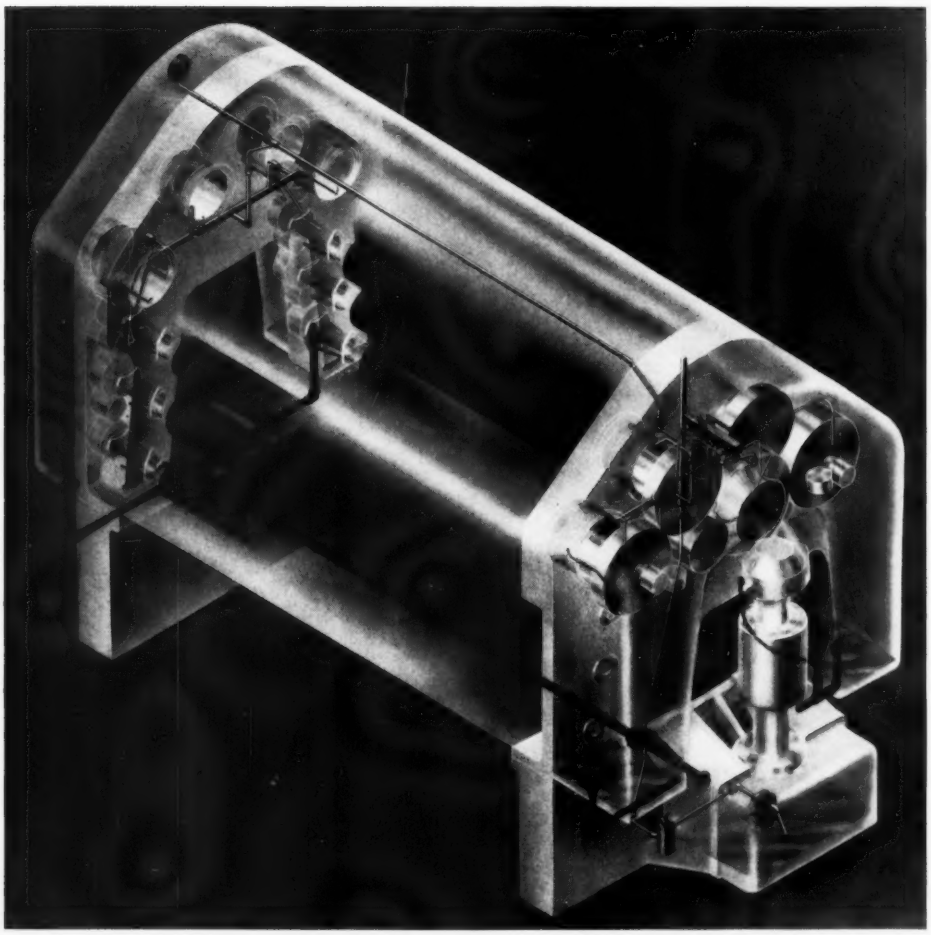
There has been a definite trend toward the use of ball and roller bearings in printing press construction. The printing cylinders as well as the folding and cutting cylinders are carried on roller bearings, and all other rotating parts such as pipe and compensating rollers or the rollers over which the web passes in going through the folders, are carried by ball bearings.

Ball or roller bearing lubrication will depend upon the nature of the housing. When it is oil tight, such a bearing can be adequately served by a light bodied straight mineral oil. Usually a viscosity in the neighborhood of 300 to 500 seconds Saybolt is advisable. Where it is not possible to use oil, however, a medium consistency grease will be found satisfactory. Grease can be more readily retained than oil so wherever the seals will not warrant use of the latter, a grease especially prepared for anti-friction bearings should be used. This should be a low-torque product to insure minimum drag, and resistant to oxidation to prevent gum formation.



Courtesy of C. B. Cottrell & Sons Co.

Figure 6 -- The Cottrell high-speed double two-color press and folder, showing the oil-tight gear guard which encloses the force-feed oil-lubricated cylinder gears.



Courtesy of R. H. Hoe & Co., Inc.

Figure 7 — Phantom isometric view of a drive gear unit on the new Hoe color-convertible newspaper press showing the force-feed lubricating system, pipe lines and circulation. Gearing is shown in block form for simplicity in tracing the oiling system. Oil is pumped from a reservoir in the main drive housing, through a filter, to the points of distribution at each end of the press unit as indicated.

Heavy Bearings May Be Self-Oiling

The bearings which carry the main, intermediate and folder driving shafts, generally are built extra heavy and equipped with either ball bearing or self-oiling pillow blocks below the bed plates.

There is but little possibility for wasted oil, in a self-oiling bearing and with the reservoir once charged, effective lubrication should be assured for extended periods. For such service a straight mineral lubricating oil having a viscosity of from 300 to 500 seconds Saybolt at 100 degrees Fahr., will generally meet the operating requirements.

On presses of older construction, plain and open bearings are in use on practically all pipe rollers and other shafting. In certain presses they are installed throughout the machine. Here the press oil recommended above for self-oiling bearings will be satisfactory.

Press Gears

The problem of press gear lubrication involves a condition wherein the grade of lubricant must be selected more or less subordinate to the mechanical construction of the press bearings and the installation of adequate gear guards. Wherever possible, a lubricant specifically designed for gearing will prove most adaptable by virtue of its economy and adhesive characteristics and its ability to resist squeezing out from between the teeth under the prevailing pressures.

The tendency of fluid oils to drip from plain or open bearings may often impair effective gear lubrication in the news press just as in the flat bed press, due to the possibility of such oils washing off the gear lubricants which are usually applied. Guarding the gears is advantageous to a certain extent but guards will not always protect

the gear teeth completely.

Heavier gears require a viscous heavy bodied gear lubricant. Many of such products are readily reduced by oil and rendered ineffective in a short time. Even certain soap thickened products such as greases suffer likewise.

LUBRICATING SYSTEMS

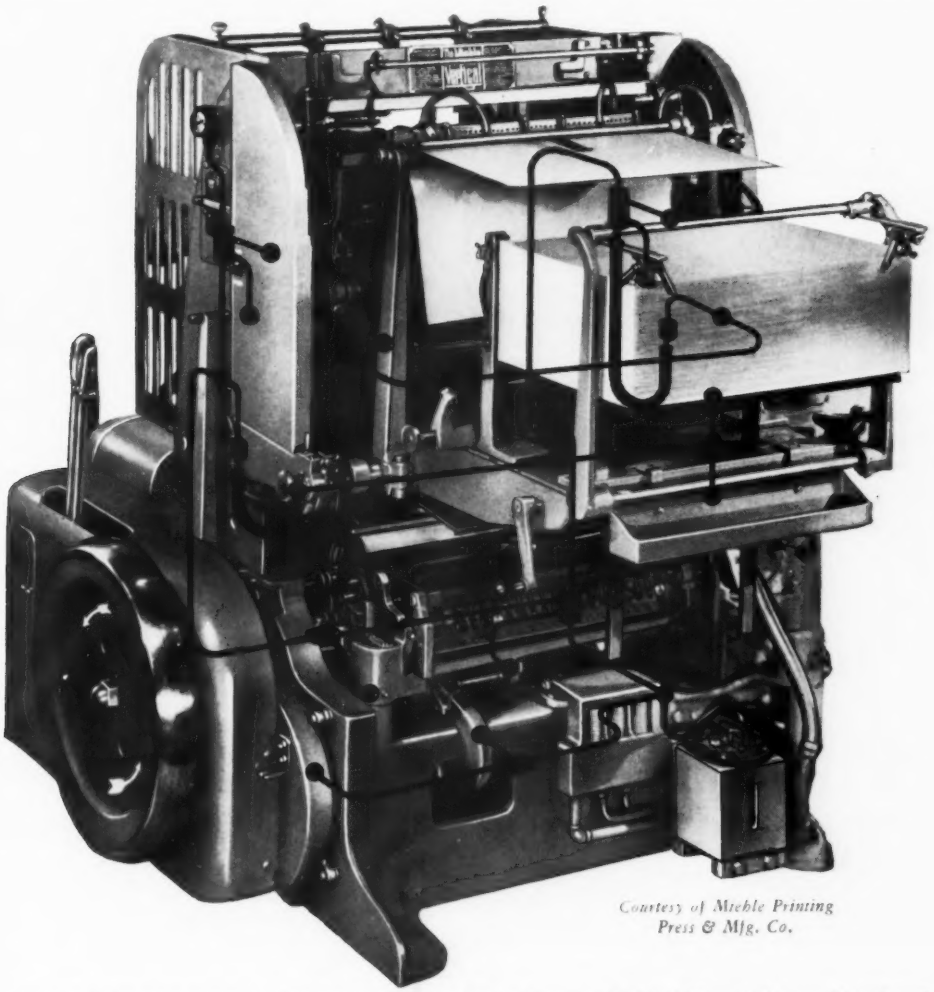
The adoption of automatic means of lubrication became very desirable as press speeds were increased. Both oiling and greasing devices are involved. Of the former, the mechanical force feed oiler, the centralized oiling systems and the wick oiler are most widely used. The spring type grease lubricator and pressure gun are preferred for grease.

Mechanical Force Feed Oiling

The mechanical force feed oiler delivers the desired amount of oil to meet the bearing requirements drop by drop under a certain amount of pressure.

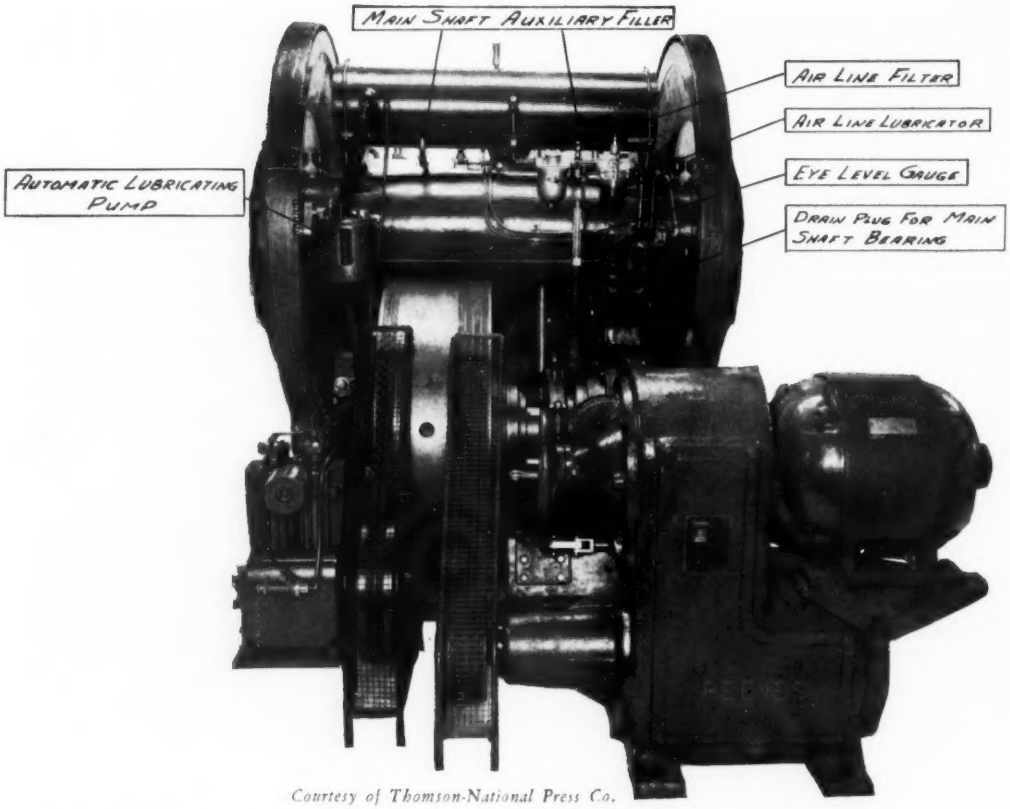
This type of lubricator can be driven from the press itself through a link mechanism, belt connection or by means of an eccentric attachment to some rotating element and functions only when the press is in operation and then at a proportional speed, i.e. the higher the speed of operation the more oil will be delivered. The pumping capacity and rate of oil flow is, therefore, variable. Such a lubricator automatically starts or stops with the machine.

A mechanical force feed oiler is limited, however, in that the capacity is comparatively small commensurate with the machine requirements. As a result, such a device must be refilled with oil at frequent intervals, depending on the speed of operation, the number of oil feeds and the rate of



Courtesy of Miehle Printing Press & Mfg. Co.

Figure 8 — The Bijur metered oiling system as applied to an improved Miehle V-50 vertical press. Note the oil reservoir, the meter units and the distributing lines to each of the 35 vital bearings.



Courtesy of Thomson-National Press Co.

Figure 9 — Rear view of a Thomson-National press showing the Reeves drive, compressor and features of lubrication. The eye level gauge shows the amount of oil in the main shaft bearing at all times. This machine is operated by an air cylinder, the packings in which are lubricated by an air line lubricator as shown.

oil delivery. This must be worked out in actual practice.

The typical mechanical force feed oiler consists of a reservoir of varying capacity ranging normally from one pint to two gallons. Within this reservoir, is the pumping element or block, which is generally of the piston or plunger type. Attached thereto is the operating ratchet, clutch or belt connection.

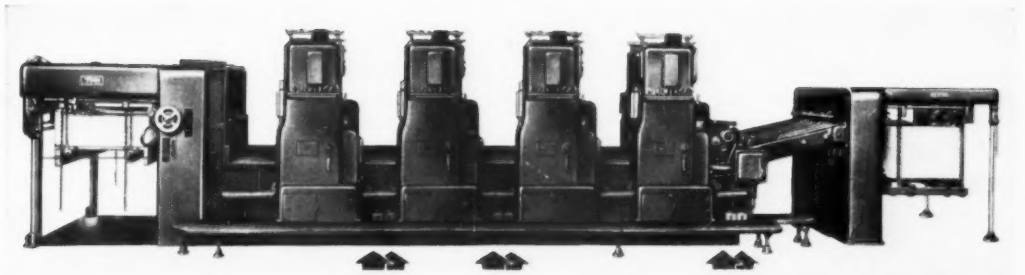
According to the service involved, quite a number of pumping units can be embodied in the one lubricator. Furthermore, this latter can be divided into two or more parts so that more than one grade of oil can be delivered by the same lubricator. The rate of pumping can be observed through a suitable gauge glass or sight feed device. This is located in the discharge line to enable observation of oil flow as the lubricator operates.

Centralized Pressure Lubrication

Centralized pressure oiling systems maintain automatic lubrication from a central control, all moving parts being flushed and supplied automatically with oil from a central tank or reservoir. The unit is attached to the side of the press. It contains a suitable pumping mechanism which is driven from the press. Lubrication of all parts connected thereto thus becomes automatic. In centralized pressure lubrication, since the amount of oil fed is restricted to as nearly as possible the theoretical lubricating requirements of the respective bearings it can be classified as a "fresh oil" system.

Quite obviously some bearings will require more oil than others, accordingly it is necessary to provide for some arrangement of regulation or control of oil flow. This amounts to a metering of the oil in terms of drops. It can be brought about either by proper individual construction of the meter-units, which on such equipment are also known as control outlets; by use of a control device located at the base of the pump; or by the installation of suitable adjusting manifolds.

Centralized pressure lubrication is relatively fool-proof and an insurance that clean oil will be delivered to the respective bearings. It is essential, however, that all parts be of rigid construction and capable of withstanding jars, shocks, and temperature fluctuations; for while piping, etc., is guarded



Courtesy of Miehle Printing Press & Mfg. Co.

Figure 10 — Side view of a Miehle 4-color offset press. Arrows at base indicate location of the six Bijur lubricators which serve the bearings on the feeder, printing and delivery units.

wherever possible, the chance of contact with external materials still remains.

Another advantage is the exclusion of dust and dirt. However, to further insure that oil is fed clean certain central oil reservoirs are equipped with suitable filtering media, such as a felt pad, which is claimed to effectively remove any foreign matter that may have entered the oil in the course of storage or handling prior to usage.

Oiling by Wick Feed

The wick feed oiler as applied to the printing press, is an individual means of lubrication. In other words, one or more such oilers must be used to serve each bearing, although they can all be gathered together at one point of location on the side of the press, each being connected to its respective bearing or other wearing element by suitable tubing.

The wick feed oiler is automatic, in that it will continue to feed oil just as long as there is any contained in the oil cup. On the other hand, where the press is to be intermittently shut down, this may develop into waste, for oil will be fed whether the machine is running or not. This can be overcome by locating a suitable shut-off cock in the oil line.

The rate of oil flow in a wick feed oiler can be regulated by the number of strands contained in the wick. These can be varied according to the bearing requirements, the size and speed of rotation.

Circulating Systems

Modern press construction also provides for enclosed type housings with circulating lubricating systems. In systems of this kind the oil is contained in the main reservoir and is pumped by means of a rotary pump to all parts to be lubricated within the enclosed housings. The oil is returned by gravity through a return line to the main supply tank. A filter is introduced in the supply line thus insuring that only clean oil reaches the parts to be lubricated. Although this type of circulating system with enclosed housings adds to the cost of press construction, it is very economical in operation as it reduces oil consumption and wear on press parts to a minimum.

Pressure Grease Lubrication

When it is desired to use a heavier lubricant than oil, the pressure grease gun, compression cup or spring type lubricator can be used for press bearings.

The typical spring type of lubricator involves a combination of the pressure grease gun plus the spring type cup. By using a spring of pre-determined tension in connection with a discharge orifice of suitable size, flow of grease therefrom can be very accurately controlled. Furthermore, this flow can be noted by the indicator with which such lubricators are usually equipped.

Courtesy of The Farval Corporation

Figure 11 — Showing a Farval Manual Dualine greasing system on a Goss "Headliner" color press. Note pump in foreground and leads to various points of distribution.

It is a simple matter to fill such a cup, requiring only attachment of the pressure gun to the fitting located in the base of the cup. It is not necessary to remove the cover, consequently there is more positive assurance that the grease charge will not become contaminated through possible entry of dust or dirt. The next step is to charge grease into the cup until the indicator rises to its full height to show that the cup has been completely filled.

Pressure grease guns are operated by compressed air, electric power, or simply hand or foot power, according to the type of gun and the pressure desired. Where a relatively simple hand pressure grease gun is used, the impression may be gained that this should be classified with the hand pressure or screw-down type of cup. Hand pressure however, as applied to a grease gun does not react directly on the bearing; it is only the means used for forcing out the grease.

LUBRICATION PROCEDURE

Press lubrication must be attended to regularly if best results are to be obtained. The flat bed press being very often a hand lubricated machine exemplified this fact. Where there is no lubricant reservoir of any extensive capacity installed, the operator has a decided responsibility. The care and regularity with which the press mechanisms are lubricated will be a measure of the operating efficiency, the power consumed and rate of production.

The function of each part requiring lubrication must always be remembered. It is not enough to simply squirt oil into every oil hole in sight or to sluice the gears or bearings. This will only waste oil and cause both the machine and floor to become an oily mess and endanger the safety of the operators. It is far better to recognize that every pair of surfaces in contact with each other possess a certain relation in their motion with respect to each other and therefore require a certain definite amount of lubrication at the points of contact to reduce solid friction as much as possible. Experience will be the best guide as to how much oil or grease to apply, and how often.

Press Design Is a Factor

Obviously, design and age of the press is a factor. A new press may require somewhat more oil and greater frequency in its application than one which has been in operation long enough to work all its mechanisms into a "running fit."

Ink rollers also must be studied. Sometimes difficulty may be encountered in press operation by such rollers bursting at the ends especially when running short forms on a flat bed press. Here considerable friction may develop between the ends of the rollers and the dry surface of the ink plate. It can be corrected by coating the plate beyond the inking line with a light or medium bodied grease in order to insure against excessive friction.

Starting Procedure

In flat bed press operation, the practice of turning over presses by hand (where practicable) a few times, is favored before throwing on the power to be sure that the proper "feel" at the wheel is present.

A competent press operator can develop a sense of judgment in regard to this "feel" which is helpful in checking up on lubrication. In fact quite as essential as knowledge of all parts requiring lubrication is the ability to judge whether these parts are functioning with a minimum of friction.

Cleaning

When the press is used intermittently, it will be advisable to rinse out bearings, oil holes and waste pad reservoirs with kerosene about once a month especially if dirt or dust is prevalent in the pressroom or when certain grades of paper are used which develop "fluff." This must be removed, otherwise obstructions will accumulate to interfere with delivery of the oil to the contact parts.

CONCLUSION

The modern printing plant or press room is an example of mass production at work to a remarkable degree. The procedure from the linotype or monotype machine, to the assembly stage of the finished pages typifies uncanny accuracy coupled with speeds which would have amazed even the far-seeing Benjamin Franklin, were he able to enter a modern shop today. Speed and register, the primary requirements in modern printing are only attainable when every part of the modern press functions perfectly in conjunction with its companion part. The designer dictates the maximum speed when he lays out the details of the press. Lubrication contributes to the continued attainment of this desired speed by keeping the parts free from wear. Register — that so important detail when printing two or more colors — also is influenced by lubrication, i.e., when wear is prevented press parts operate so that there is minimum variation in shaft and bearing alignment and the least possible change in gear tooth meshing.

The thought which has been given to controlled lubrication is evidence of the respect the printer of today has for this most important maintenance item.

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TEXACO LUBRICATION RECOMMENDATIONS
FOR PRINTING AND BINDING MACHINERY

In the Press Room — on the Web Press

PLAIN BEARINGS — Oil Lubricated	Texaco Alcaid or Algol Oils
Grease Lubricated	Texaco Regal Starfak No. 2
BALL BEARINGS — In Oil-Tight Housings	Texaco Regal Oil B (R&O) or Texaco Regal Oil C (R&O)
Grease Lubricated	Texaco Regal Starfak No. 2
GEARING — Enclosed	Texaco Meropa Lubricant 3
Exposed	Texaco Crater 2X Fluid
CAM MECHANISMS — Oil Lubricated	Texaco Meropa Lubricant 3
Grease Lubricated	Texaco Regal Starfak No. 2

On the Flat Bed Press

HEAVY GEARS	Texaco Crater 2X Fluid
BEARINGS, CAMS, CHAINS AND SMALLER GEARING AND AIR CYLINDERS:	
Oil Lubricated	Texaco Alcaid or Algol Oils
Grease Lubricated	Texaco Regal Starfak No. 2
PLATE AND ROLLER LUBRICATION — WHERE RUNNING SHORT FORMS	Texaco Regal Starfak No. 2

On Platen and Other Types of Presses

BEARINGS AND CAMS — Oil Lubricated	Texaco Alcaid or Algol Oils
Grease Lubricated	Texaco Regal Starfak No. 2
GEARS	Texaco Crater 2X Fluid

Paper Feeding Devices, Folders and Cutters

BEARINGS AND CAMS — Oil Lubricated	Texaco Alcaid or Algol Oils
Grease Lubricated	Texaco Regal Starfak No. 2
GEARS	Texaco Crater 2X Fluid

In The Bindery — On the Gatherer, Stitcher and Coverer

BEARINGS AND CAMS — Oil Lubricated	Texaco Alcaid or Algol Oils
Grease Lubricated	Texaco Regal Starfak No. 2
GEARS — Where Operating Open	Texaco Crater 2X Fluid
Where Bath Lubrication Is Possible as on Certain Types of Worm Gearing	Texaco Meropa Lubricant 3 or 6

In the Composing Room and Foundry on Linotype, Monotype and Autoplate Machines, Plate Curving Machines, Routers, Saws, Planers, Etc.

BEARINGS AND CAMS — Oil Lubricated	Texaco Alcaid or Algol Oils
Grease Lubricated	Texaco Regal Starfak No. 2
GEARS — Where Operating Open	Texaco Crater 2X Fluid
Where Bath Lubrication Is Possible, as on Certain Types of Worm Gearing	Texaco Meropa Lubricant 3 or 6
ELECTRIC MOTORS — Oil Lubricated	Texaco Regal Oil C (R&O)
Grease Lubricated	Texaco Regal Starfak No. 2

Note: For circulating or bath oiling systems on any bearings use Texaco Regal Oils C (R&O) or E (R&O).

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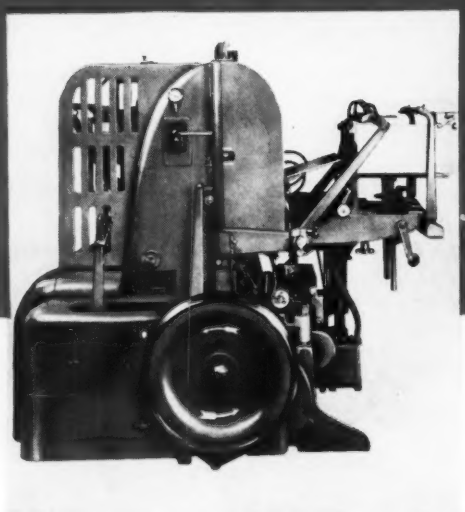

Miehle Vertical Press, Model—V-50, equipped with automatic oiling system. Photo courtesy Miehle Printing Press & Manufacturing Company.

EFFECTIVE bearing lubrication plays a big part in assuring trouble-free, uninterrupted press runs. Use *Texaco Regal Oils (R & O)* — made to keep lubricating systems clean, your automatic oilers in top form.

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